The MAC Flyer

FEBRUARY 1974

MILITARY AIRLIFT COMMAND

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The MAC Flyer

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For Greater Efficiency
in MAC Air Operations

FEBRUARY 1974 **MAC RP 127-5** **VOL XXI, NO. 2**

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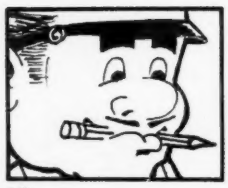

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The MAC Flyer is published by the Directorate of Safety, HQ MAC. The contents are informative and not regulatory or directive. All names in accident stories are fictitious and no information concerning aircraft accidents may be construed as incriminating under Article 31, UCMJ.

Contributions, comments, and criticisms are welcome. Write: The Editor, The MAC Flyer, MAC/IGYE, Scott AFB, IL 62225, or call: (618) 256-3534, Autovon 638-3534. The Editor reserves the right to change manuscripts to improve them or correct technical errors.

The magazine is available from: The Superintendent of Documents, Government Printing Office, Washington, DC 20402. Price 50 cents per copy, $5.25 per year ($6.60 foreign).

Distribution F, X; OPR MAC/IGYE.

The Integral Crew System — Gen Carlton explains its purpose and what it will mean to the Military Airlift Command.

Authority as well as Responsibility

by Gen Paul K. Carlton, Commander
Military Airlift Command

Ed. note. Co-authors are: Lt Gen Jay T. Robbins, Vice Commander; Maj Gen William A. Dietrich, Chief of Staff; Maj Gen Alden G. Glauch, DCS/Operations; Maj Gen Lester T. Kearney, Commander 21st AF; Maj Gen John F. Gonge, Commander 22nd AF; Brig Gen Thomas A. Aldrich, Commander AWS; Brig Gen Glenn R. Sullivan, Commander ARRS; Maj John W. Ray, Supervising Editor; Capt Theodore R. Heil, MAC Directorate of Information.

A major change affecting the professional lives of virtually every crew member of the Military Airlift Command is underway. At this moment your squadron is in the process of converting to a new Flight Commander and Integral Crew System.

Since this system is a significant departure from the way MAC has traditionally organized its units and crews, it is important for all of us to know why this is being done and what we will gain by it.

Management experience has shown that the optimum span of control for any one individual should not exceed eight or nine people. We have attempted to conform with these standards throughout this Command in every area except in the utilization of our most vital resources — our crew members. There exists in MAC flying squadrons a supervisory gap below the squadron commander level. To provide this intermediate level of control, we are introducing the Flight Commander and the Crew Commander System into the chain of command of our units. The Flight Commander System improves the span of control, but the number of people supervised is still too large. To further reduce this span of control, we are adopting a system of integral crews. This overall adjustment will

Authority —continued

provide increased positions of authority and responsibility for young officers at an early point in their careers and will enhance their training for future leadership in the Air Force. In other words, we are making it clear that our crew commanders will have the authority to go with the responsibility they have always had!

A number of things have shown conclusively that this has not been the case in the past. Some of our own fliers have said so. Last summer I sent a questionnaire to every copilot in MAC asking for frank, open comments on how they viewed their jobs and the Air Force in general. Replies were kept anonymous, but I was startled by some of them. Many of our young pilots were dismayed at the indecision and paucity of direction prevailing at their level. Except while flying (and they were happy with the amount of flying they were getting in MAC), these men felt they were not getting the day-to-day training nor the supervision necessary to prepare them as future leaders. Some said they felt unimportant because they had few meaningful duties to perform and weren't receiving the personal attention so important to their career development. They resented this and rightly so. These views reinforced my belief that far more must be done to foster a sense of being a part of an identifiable group and of having well defined responsibilities. These men are not dissidents or malcontents. They are young, ambitious officers, vitally interested in the future of the Air Force as well as in their own Air Force careers — a fact which should tell us a great deal.

Formed crews for future challenges

A more tragic indication of this casual approach to leadership came to light during the investigation of a recent accident. The lack of crew discipline and supervision during much of that mission was readily apparent. No one seemed to know who was in charge, particularly during periods of scheduled crew rest. Crew members cannot afford to ignore their responsibilities simply because their aircraft is on the ground.

The price of poor supervision

Do you realize that pilot retention in MAC is the lowest of all major commands in the Air Force? Much of this problem can be traced directly to the quality of supervision and leadership training in the Command. Feelings of vague unity, of not belonging, of playing unimportant roles were reasons given for this exodus. It is obvious, then, that many of our young pilots are far from happy with MAC.

Yet, what else can we expect in an environment where supervisors write effectiveness reports on crew members they rarely see, fly with, or directly supervise. This is not the way to develop the leadership that MAC must have. It is not the type of supervision expected in a dedicated, professional force. And we cannot afford the undesirable results that will inevitably follow.

Over the past few years, MAC has lost that vast reservoir of pilot experience which served it so well for more than a generation. Promotions, retirements, and other factors have caused our line crew force to evolve from one dominated by the 5,000-hour pilot to a force consisting primarily of aircraft commanders with less than 2,000 hours. And, while the higher experience level of our navigators and enlisted crew members is important, it cannot compensate for the loss of pilot experience.

This drop off in experience has occurred at a time when MAC aircraft and missions are more complex and demanding than ever before. The latter, in itself, requires better team action by our aircrew members and more positive leadership than has been necessary in the past. It means that the authority to effectively manage and supervise must not stop with the squadron commander, but must extend down to the aircraft commander and his crew, the very heart of our operation.

This is what the MAC Flight Commander and Integral Crew System is all about. It makes a crew commander directly responsible for his crew and each crew member responsible to him, not just while flying, but in the squadron and during periods away from home station. Formed crews, whose members are accustomed to working together and who know each other's strengths and weaknesses, will play a big part in helping us meet the challenges ahead.

In the formulation of this system, a conceptual approach was developed by my staff. This concept was forwarded to the numbered air forces and the wings for review and comment. Various alternatives were considered at a conference held here at Scott. Some of your fellow crew members assisted in the formulation of the concept finally adopted. Such an in-depth review was necessary to ensure that the system to be implemented was the most feasible for this Command.

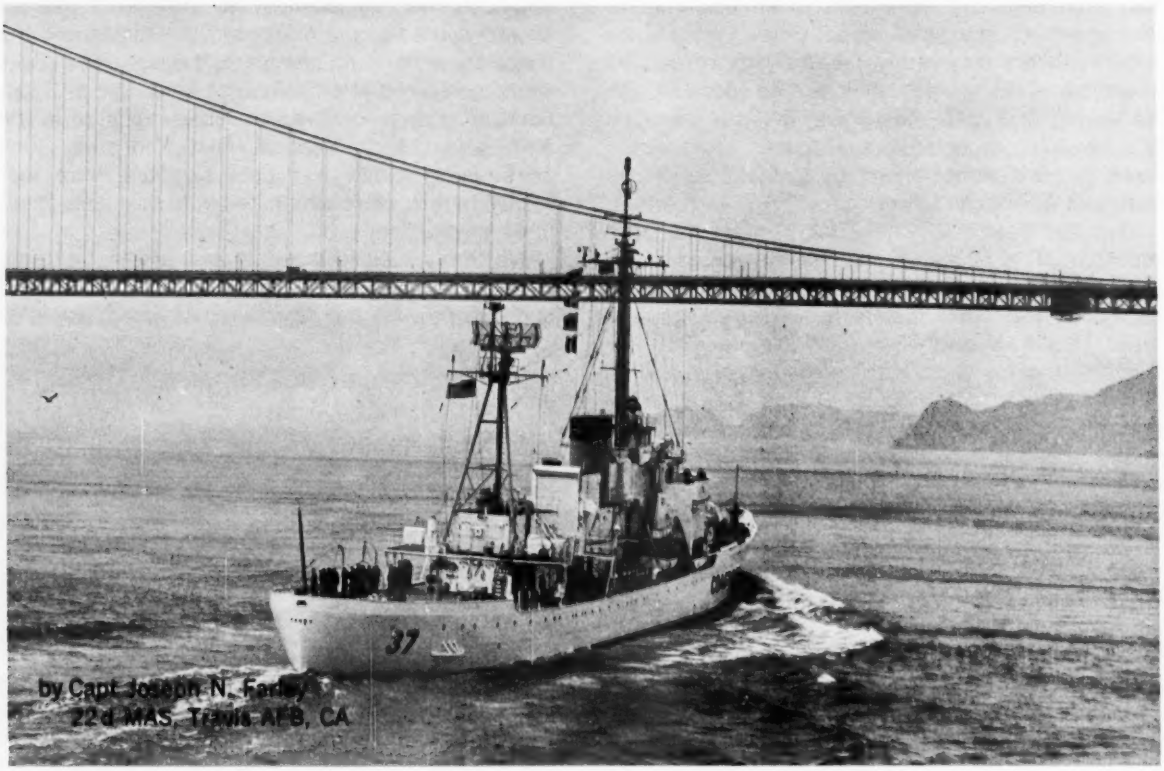
We firmly believe that this new system not only will develop our crew capabilities to the fullest, but will provide the leadership training some of our younger officers so vitally need.

Responsibility and authority in the cockpit

Each of you should understand the reasons for this major organizational change. It is a system which has been proven effective in other major commands. I know that you, as an individual member of this Command, will do your utmost to ensure its success and that the Command as a whole will respond in the same outstanding manner as it has to requirements in the past. We do a great job as a matter of routine. With your continuing efforts, we can do it even better.

MAC crews for years welcomed assistance between Hawaii and the CONUS, but in a few months...

Farewell, November



by Capt Joseph N. Farley
22d MAS, Travis AFB, CA

An unusual partnership — one that has endured for better than a quarter of a century between trans-Pacific aircrews and an ocean station called November — is coming to an end, the victim of budget cuts and modern navigational technology.

For 33 years, fliers have enjoyed this relationship with U. S. Coast Guard crews who manned the vessel which provided navigational assistance between the Pacific coast and Hawaii.

No MAC old-timer likes to admit that there were times when he might have doubted the reliability of either his navigator or aircraft equipment, but most do readily agree that checking in with November on those tedious overwater flights came as a welcomed diversion.

Get Well Fix

And whether we like to admit it or not, a get-well fix and the latest wind from November occasionally was the last reliable position many flights could obtain prior to slipping through the Hawaiian ADIZ. Many a crew, civilian and military alike, enjoying the soft, warm evening breeze on Waikiki, drank their first round as a toast to Ocean Station November. In exchange for November's welcomed service, flight crews often provided November with a bit of service of their own. Late at night, with little traffic on the air, pilots, navs and an occasional stewardess have been known to read ball scores and headlines from stateside papers,

and chat with the boys on November.

Airmail by Phone

Very often, aircrewmen copied messages onto post cards and mailed them to a Coast Guardsman's girl friend, wife, or family. Many aircrew members, after arriving stateside, telephoned messages to the families of Coast Guardsmen living nearby and, in turn, delivered replies to November on their next trip out.

It was, obviously, a warm, professional relationship with just a bit of unofficial comradery on the side. That's why, old-timer or new guy, most MAC crewmen were surprised and sorry to hear that November will soon be gone. On 30 June 1974, the U. S. Coast Guard Cutter "Midgett" will sign off Ocean Station November for the last time and 126.7 will fall silent.

Budget Victim

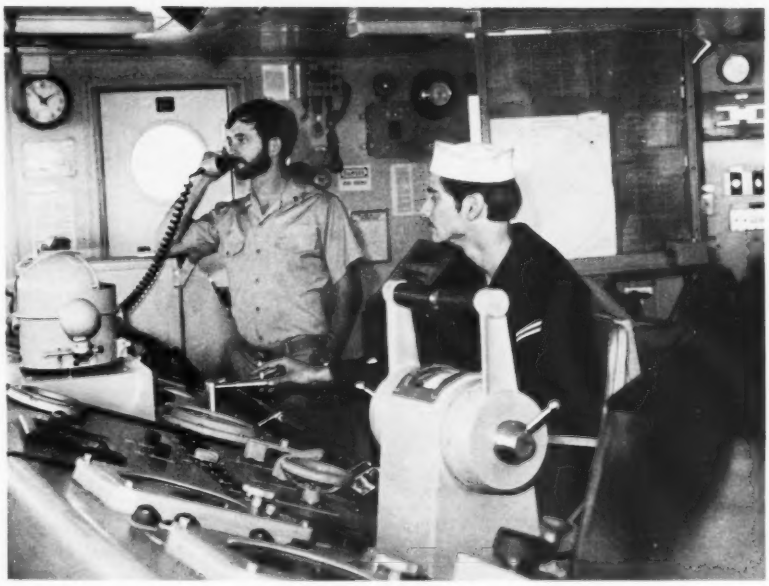
Budget considerations, primarily, dictated the decision to terminate November ($348 per hour to operate a 378-foot cutter), but major changes in aircraft technology hastened the moment. Capt Richard F. Malm, commander of the "Midgett," explained: "With the increase in Inertial Navigation Systems (INS) equipped aircraft, there's less need for November to provide navigation services to aircraft. Our principal means of navigation are celestial and loran, and because of the position of the stations, loran is marginal. That leaves celestial, and with cloud cover that means we might be stuck for a day or so without an accurate fix. The INS aircraft very often know their positions better than we do!"

November in WW II

Of course there's more to November's duties than navigation services. Originally, the threat of undersea warfare caused most Merchant Marine vessels to cease broadcasting weather reports. At the same time, air traffic was on the increase, and these planes needed weather information. In order to provide weather observation service, conduct oceanographic research, aid distressed ships or planes, and provide en route navigation aids, the Coast Guard established the ocean station network, with the first November patrol taking its place in the Pacific in early 1940.

Ocean Station November watched the Pacific skies as U. S. war planes carried the war to the Pacific and Far East. U. S. Army and Navy aircraft, forerunners of MATS and eventually MAC, supported the tactical engagements with a steady stream of parts, supplies and personnel. On the first leg, the long one, they were glad to have November.

Even with the war ended, support of the new military presence in the western Pacific continued. Civil aircraft began using the route more frequently, carrying vacationers to Hawaii's shores.



Deck Watch Officer on the bridge of the "Midgett."

NOVEMBER — continued

Korea, and the massive airlift began again. C-124's led a new wave of aircraft following the sun, and in November's Combat Information Center, a new generation of young men watched the radar set, the communication console, and the plotting board. The aircraft fly a little higher and a little faster, but still there's a closeness between the crews and November. By mid-1950's, with a tenuous peace in Korea, most of November's business was with the airlines.

Ditched Clipper

In October, 1956, a Pan American Airways Clipper developed engine trouble, ran into icing conditions, and could not stay airborne. USCG Cutter "Pontchartrain" was on Ocean Station November and quickly assisted the troubled aircraft. Providing sea surface information, the "Pontchartrain" vectored the stricken aircraft to a successful ditching. Long boats, already in the water as the plane ditched, rescued all 31 persons on board.

In the early 1960s, a new class of cutters began to serve on Ocean Station November. Originally, 255-foot cutters, like the "Owasco," and 327-footers, like the "Taney," patrolled. They were relieved from some of their duties by 378-foot vessels, like the cutters "Sherman" and "Midgett."

Jets Take Over

In the skies, C-130's, C-133's, C-135's, and the near legendary C-124, gave way to the C-141. Now, C-5's and C-141's carry the bulk of military cargo, with only a few of the prop jobs making the crossing. The new jets fly higher and faster. Their nav aids are more reliable. They seek November's help less frequently.

During the late 60's, the greatest air effort in history was under way and November contacts averaged more than 100 aircraft a day. November watched the planes and men go and she rejoiced when they returned. November had special greetings for the MAC C-141 that brought the first moon-mission astronauts back to the mainland and she proudly hailed each and every Freedom Flight during Operation Homecoming.

But now, November's tasks are being performed by machines. INS, weather satellites, automated weather buoys, and, soon, navigation relay satellites. They all add up to the end of an era, and the passing of any worthwhile effort is sad. MAC will miss November, not only for technical reasons, but for sentimental ones as well.

Perhaps the sadness is for ourselves, too. In a twinkling, there will be those of us who knew November and those who did not. Those who did not will never understand the special relationship. Those who did will become fewer, and, soon, we will reach the end of our own era. The new guys with even newer and better technology will move in behind us and begin to push, and like November, we'll have to move aside.

Maybe that's why it hurts to say, "Farewell, November, and thanks for everything."

Radar operator tracks a MAC aircraft in the Combat Information Center.

Global Notes

lifesaver of the year

A1C Joe Cammarano of the 436 MAW, Dover AFB, DE, is the MAC Aircrew Life Support Man of the Year.

Airman Cammarano's 12-hour shifts are filled with inspections of life support equipment and C-5 aircraft configurations. Each time an arcraft comes in, its equipment is cleaned and tested.

"This award is to show appreciation for an outstanding performance. Joe's job is sometimes taken for granted, but the job is extremely important," said Col Emery J. Crane, deputy commander of operations.

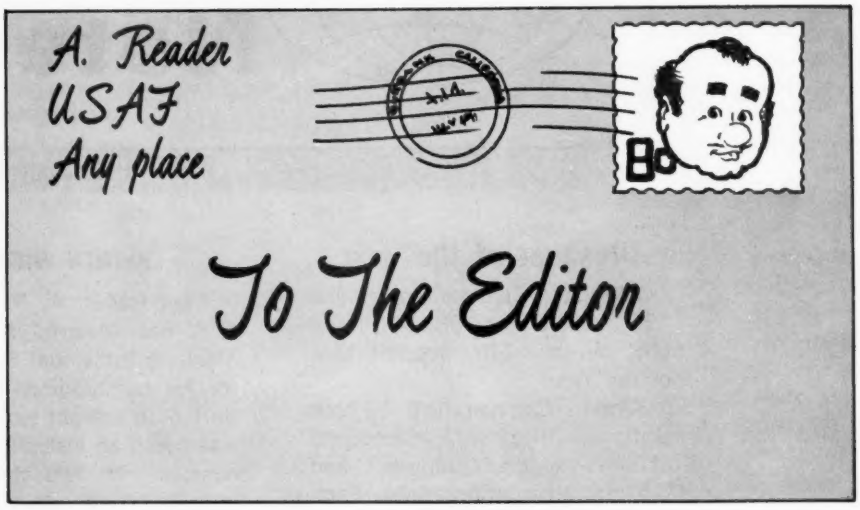
award winner

Capt Robert F. Raggio, 1550 FTS, has received a MAC Outstanding Individual Safety Award for his outstanding performance during an inflight emergency. He was flying an instrument training mission with two student pilots in a TH-1F aircraft when the low rpm warning light came on and the horn sounded in flight. He quickly spotted the difficulty as internal engine failure, successfully entered autorotation, and made an excellent forced landing.

your feature

We're continually searching for material for Global Notes. We need items from our safety officers in the field. Any outstanding feat by military or civilian personnel in the area of flying safety can be used. As a reminder, MACR 900-1 requires an information copy of each approved MAC Distinguished Individual Safety Award (formerly Outstanding Individual Safety Award) be forwarded to MAC/IGYE for review for possible use as a "Good Show" feature or as an item of interest for this feature. We're getting very few.

Letters To The Editor



Former Storm Chaser

I really enjoyed your October 1973 issue — the first issue to reach us since I left Air Weather Service last summer (1972). Unless another WC-130 has been hit recently, the "It's a Fact" (page 30) bird was hit about three hours after losing the radar. I know. It was a hairy ride. "Aboard Flight Gull Seven" brings back some memories. Andy Anderson did his usual great job. Thanks for the outstanding magazine!

Robert Lee Clark, Capt, USAF
"Copilot Clark" of the "Hurricane Hunters"
16th Special Operations Squadron
APO San Francisco 96304

★ **And thanks for the kind words of praise. The incident referred to in "It's a Fact" occurred in July 1973 so apparently it was not the one involving your plane. Sounds like a hazard of the trade for storm chasers.**

Pie in the Sky

Your "Quick Stopper" labeled "It's A Fact" in the October 1973 issue Quick Stopped me in my seat, released the "spring loaded to the thoroughly disappointed position" tension regulator, and resulted in this letter.

I thoroughly agree with the intent of the blurb, but I think you inadvertently took a cheap shot at one of the 9th Weather Reconnaissance Wing (MAC) WC-130 aircrews when you failed to point out that the entire intent of cyclone/hurricane/typhoon aerial reconnaissance is to do precisely what the article cautions against: to properly prepare and soundly decide just exactly how to penetrate one of nature's most severe weather phenomena, a fully developed hurricane or typhoon.

I got the impression from your presentation that the crew in question was guilty of some nebulous transgression, and it is just possible a few of our brother MAC aircrew members might also get the same meaning, from reading the article.

I will be satisfied if you print a clarification to your thinking and meaning in the article, as an unintentional pie in the face has the same effect on the receivee as an intentional one.

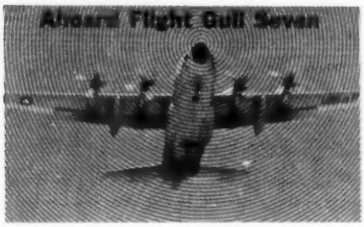
James B. Morrow, Jr., Major, USAF
WC-130 Standardization Pilot
9th Weather Reconnaissance Wing
McClellan Air Force Base, Calif

★ **No pie intended. Obviously, the aircraft in this story was doing its thing in the weather, and we did not mean to imply that the crew was guilty of any wrongdoing. Our point was that proper planning is required to keep a plane out of lightning**

since no aircraft is immune to strikes — not even those whose business it is to seek out the heavy stuff.

About "Gull Seven"

Reference Oct 1973 "Aboard Flight Gull Seven." This was a great article! However, I'd like to know why it came from a book called "Hurricane Hunters." A book with the above name was published way back in 1955 by Ivan Ray Tannehill. Did Mr. Anderson draw from this book?



The weather officer on these storm missions is still the only crew member who is not allowed crew member wings.

Steve Sokol, Capt, USAF
Ex-Typhoon Chaser
Sheppard AFB, Texas

★ This article was one chapter out of Mr. Anderson's latest novel, "Hurricane Hunters," and was used in THE MAC FLYER because it vividly portrays a mission still being flown by MAC aircrews. We do not know whether Mr. Anderson drew from the book you mention.

Rated Supplement

I recently attended a briefing on the Torrejon accident, and the main current of thought revolved around a need for experienced pilots back in MAC — in C-141's. The people briefed at Norton had even been told that MAC would be pulling people out of the rated supplement to help gain this higher level of experience. Shortly after the briefing I was notified of assignment to the rated supplement. Why would I, with 1,900 plus total hours and 1,700 hours in the C-141, be reassigned if MAC were really serious about their need for experienced pilots? I realize the theory behind rated supplement, but from my observations there are few enough AC's, let alone experienced AC's.

John W. Barton, Captain, USAF
15th Military Airlift Squadron
Norton AFB, California

★ Personnel at the MAC Assignments Directorate feel that you may have misinterpreted the statement concerning the rated supplement. They say that statements made concerning withdrawal of experienced pilots from the supplement refer to assigning highly experienced field grade officers, presently performing support duties, to operational duties upon completion of their supplement tour. When this situation occurs, junior, less experienced pilots will be required to replace them. The Air Force and MAC are presently experiencing a shortage of pilots in the 7-13 year group, the group traditionally selected for operations staff and rated supplement duties. Since these individuals also possess the flying experience necessary to train future pilots, they will be assigned in ever-increasing numbers to flying units.

The EUMR

The Emergency Unsatisfactory Materiel Report is the best way for us, operations and maintenance personnel, to tell the Air Force Logistics Command and our prime Air Materiel Area about the accidents or incidents that are caused by some part in our airplane breaking. The Emergency (E) part of the EUMR means that if the unsafe condition caused by this broken part is not fixed, it could result in a serious or fatal injury, extensive damage to, and/or destruction of our valuable equipment. The prime AMA is required to establish a Materiel Improvement Project (MIP) when an EUMR is submitted. It forces the AMA to look into our problem and hopefully come up with a fix to make our airplane safer.

Incident reports through safety channels do not always get the proper attention they deserve. If a safety report is required because of the materiel failure of a part, the best way to attract everyone's attention to the problem is via a combination of the AFR 127-4, incident report, processed by the Flying Safety Office, and an EUMR processed by Maintenance Quality Control. The failed part must be identified as an EUMR exhibit and processed properly.

As a crew member or maintenance man, if you suspect a part has failed materially during flight, you should notify either the Flying Safety Office or the QC shop so someone can follow up on it and take the proper corrective action.

Each time you submit an EUMR it takes time and creates more paper work. While we all echo, "Who needs more paper work," an EUMR is well worth the time and effort, and while cranking out another report on a joint message form may not be to your liking, EUMR's are very big at AFLC. What we are doing for AFLC is building a "bank" of data so they can go to "the man" who controls the money and say, "Look, these parts have failed 50 times and we'd better fix them before someone gets hurt." Then they show the man their stock of EUMR's because that's all he believes in.

I personally believe that not everyone of us operations and maintenance personnel in MAC is doing his job to identify these materiel failures for QC so that they can submit the proper paper work to make our flying machine safer.

Jack N. Dole, Capt, USAF
Flying Safety Officer
63d Military Airlift Wing
Norton Air Force Base, Calif

★ Right on!

Pride, rationalization and pushing too far sometimes spark tragic events.

Knowledge vs Desire

One of the most difficult aspects of flight safety education is the conversion of skeptics into believers. Aircraft accidents will generally accomplish this, but only if the person being converted is involved in the accident himself or has a close friend involved in one. Needless to say, this is the undesirable way.

A pilot must know where and how he is liable to be involved in an accident. Not just in relation to emergencies and other obvious pitfalls, but in relation to the situations and environmental atmospheres that precipitate emergencies and potential accidents. These are the subtle and subconscious causes of accidents, and they are the most heinous of all the causes in that they are so obvious and plain, but yet so nebulous.

We are all human, and because of this, we share common failings. There are three main peculiarities of the species Pilotorium Humanis that account for the majority of aircraft accidents. Do not deny these manifestations of human nature, because we all have them as an inheritance of our breed. If you have not noticed them by now, you will eventually.

The First Peculiarity

The first of these peculiarities is the fact that men tend to be prouder of their willingness to take a chance than of their caution, conservation,

and carefulness. No doubt many of us can recall flying in marginal weather to make that date or stretching our fuel supply to avoid an extra refueling stop, or even attempting hazardous flights in aircraft we were not fully competent to be flying. Sure, we all made it. From the stories we hear, we would think the odds are predominantly in our favor, but are they? Unfortunately, testimony to the contrary reposes quietly in flight safety files under the heading of "Pilot Factor."

While remembering these talks of daring episodes, how many can remember the times you have heard of cancelled flights because of weather or of diverting before reaching the destination because of low fuel? Not many, I'll wager. Why? Because it is human nature to romanticize, to startle, to glamorize. Flying is a romantic business. It is so because it can be hazardous.

Any profession or activity that involves hazards over and above those encountered in the more common occupations is romantic. Who does not admire the bullfighter, the mountain climber, the auto race driver? There is an undeniable human tendency to romanticize the risk-taker more than the man who figures a way to avoid the risk.

To what does this all add up? Simply this: conservatism and caution must compete with a subconscious tendency to regard these qualities as a form of timidity unworthy of a pilot.

The Second Peculiarity

The second undesirable peculiarity of human nature is the fact that men tend to use their powers of logic and reasoning to find justification for the things they want to do rather than to determine what is best to do. In other words, we tend to compromise our better judgment in favor of our desires by rationalizing.

Basically, man is a creature of emotions, feelings, impulses, and unrecognized urges, all kept under precarious control by a flimsy bridle of intelligence, rationality, logic, and the painful whip of authority and social pressure. Most of us when confronted with a problem involving a conflict between what we know we should do and what we would like to do, tend to seek a way to satisfy our desires while convincing ourselves that it is the proper thing to do.

"I'd sure like to get back to play in that golf tournament this weekend, but the weather looks pretty mean," we say. "What the heck, I need some weather time anyway, and if I stay low I probably won't get any icing. How convenient. Warm up the golf sticks. I'm on my way!"

When man's basic nature, his fundamental urges and strong desires pull him toward one decision, and his education inclines him toward another, all too frequently he will go with his feelings.

The Third Peculiarity

Now the third undesirable characteristic of man is this: men will risk losses out of all proportion to possible gains if they feel that through their skill and luck they can probably avoid the loss. Why do people in automobiles attempt to pass on hills or blind curves? Why do pilots flying a poor landing approach go on and attempt to land when they know they should go around? They know better. Why do they do it?

Why? Simply because it is one of those undesirable human quirks. What is to be gained and what is to be lost? A little time in the case of the former, a life in the case of the latter. What gambler would play odds like that? Still, if someone asked if you were a gambler, how would you answer?

If you were to sit with a man in his living room and give him these situations, he would tell you he would do the safe thing. But put him in one of the above situations and see what he does. More men than you would expect will gamble. It is human nature, and it comes back to the old conflict of knowledge versus desire.

Being a pilot can be a hazardous profession, but it is only as hazardous as you want to make it. Control your desires, and be aware of the traps human nature has laid for you. In years to come, remembering what you have read here may save your life.

— APPROACH

Mishaps with a Moral:

Unscheduled Arrivals

More aircraft accidents occur during the approach than during any other phase of flight, often striking at the conclusion of flights in which no prior difficulties were experienced.

Such accidents occur most frequently during periods of reduced visibility or at night when a pilot's normal reference points become more evasive.

Illusions, misjudged positions, and that diabolical temptation to abandon glide path reference in the transition to visual flight, have proven disastrous to many of the most experienced pilots.

Two accidents in this article involved transport aircraft and caused the deaths of a great many passengers. The third, although limited to aircraft damage only, is an example of what overconfidence and willful dereliction can cause.

Unchecked Position

En route to Europe, a commercial DC-8 jetliner with 78 passengers and a crew of 11 crashed 12 miles short of the runway at a scheduled enroute stopover. There were no survivors.

Investigators found no evidence of inflight fire or explosion. Engines were operating normally and there was no structural failure. Weather was not considered a factor. Communications and navigational aids were operating normally.

Flight data recorder traces and cockpit voice recorder readouts were recovered intact. Using these and approach control tapes, investigators pieced together the sequence of events leading to this disaster.

Descent clearance was issued and the aircraft departed FL 350 for FL 65 with intermediate level-offs. Descent was routine. The latest weather and altimeter settings were acknowledged by the crew. Passing through FL 100 over a radio beacon, 38 miles from the airport, the flight was cleared to contact approach control. Reporting level at FL 65 at 23 miles from the airport, the flight was directed to intercept the localizer and call the outer marker inbound. Descent to glide slope intercept altitude of 2,100 feet was resumed.

The voice recorder indicated that the airport runway lights appeared dim to the pilots, but the rate of descent was increased as the aircraft continued inbound toward what the pilots thought was the runway.

A few seconds before completing the landing checklist, investigators determined, the pilots sighted the lights on the actual runway. A shout for power was the last sound on the cockpit voice recorder.

Insufficient time remained for the engines to spool up to take off thrust and the main gear contacted the east bank of a river. The staggering jetliner skipped 270 feet across the river, slammed into an embankment,

and burst into flames.

Findings and conclusions of the investigators were: the aircraft was never established on the localizer or glide slope. At 23 DME, the rate of descent was accelerated when the pilot sighted what appeared to be runway lights. The aircraft continued to descend below the glide slope intercept altitude and decision height. Other factors indicated that the crew displayed inexperience, lack of orientation, unfamiliarity with local terrain, inadequate or incorrect briefings, and noncompliance with established procedures contained in approach plates and airline operations manuals.

Causes

In conditions where an instrument approach was preferable, though not necessary, the pilots ignored their flight instruments after sighting the false runway. Instead of leveling off at glide slope intercept altitude, the pilot continued to descend after sighting lights that led him to believe that he had reached the outskirts of the airport.

The flight director transfer switch was not positioned to the VOR glide slope position. Had it been, a glide slope warning flag would have appeared. The pilots apparently disregarded their altimeters in their VFR configuration. The aircraft descended to just above threshold height before the crew realized they were too low.

The immediate cause of this tragic accident was the crew's disregard of established procedures and the abandonment of instrument indications without having sighted the runway.

(Adapted from BOAC Air Safety Review)

False Lock-On

The jet transport whined through the cold air at 12,000 feet, entered a localizer holding pattern above mountainous terrain, and turned back to intercept the inbound course.

"You're holding left turns. Is that correct?" Approach Control requested, confirming that previous instructions were being followed.

The aircraft commander, operating the radios while his copilot flew from the right seat, confirmed the left turns.

"Are you outbound or inbound in the pattern?"

"We're inbound on the localizer now."

"Did you just complete your turn inbound?"

"Affirmative," assured the pilot.

"You're cleared for a straight-in localizer approach to cross Howard at or below 9,000, inbound." Howard is an intersection just six miles from the final approach fix.

The copilot aligned the plane to intercept the easterly localizer course, but wasn't descending fast enough, so the pilot offered his assistance. "We're too high. I'll show you how," advised the aircraft commander. The landing gear was lowered and the rate of descent increased to comply with the 9,000 foot clearance just issued by Approach Control.

"Swing 'er right on down, four thousand feet a minute. Okay, fine . . . and we're just approaching the final approach fix," instructed the pilot, thinking he had already passed Howard.

"Just coming up on the final approach fix, right?" repeated the copilot, his instruments still indicating on course.

"Tower, final approach fix inbound," the pilot reported. These were his last words.

The transport slammed into a mountain at the 2,500 foot level. The aircraft impacted the ground on course but eight miles short of the final approach fix.

The accident investigation board found that, in spite of the crew's apparent positive position reporting, not once in the approach pattern did they report their actual position. The cockpit voice recorder showed that they had somehow been misled by a signal which caused a 45 degree error in the VOR readings.

This was an important factor because Howard, the fix they were to cross at 9,000 or below, was an intersection formed by the localizer course and a radial off a VOR located to the right of final approach. Using this misleading information, the crew actually began descent much farther away from Howard than they believed. Not realizing their true position, they passed through the obstacle clearance altitude listed on the enroute chart. The plane actually crashed two miles short of Howard.

The Board never determined exactly where the misleading navigational information originated. Five hypotheses, all compatible with the navigational error, were developed: a malfunctioning Doppler VOR station, malfunctioning navigational equipment, signal interference, noncompati-

bility between the Doppler VOR and aircraft navigational systems, and operational factors. (Note: The term Doppler VOR station may be confusing to some MAC crews. It has nothing to do with the airborne doppler equipment in some MAC aircraft. It involves a technical method of electronic radial transmission, but the display in the aircraft remains unchanged.)

But none of them could be pinpointed as the most probable explanation for the series of events which led to the accident. The probable cause was finally listed simply as a display of misleading navigational information concerning the flight's progress along the localizer course, which resulted in a premature descent below obstacle clearance altitude.

Two other significant factors were brought out during the investigation. The crew failed to use all available navigational aids to check the flight's progress (two nondirectionl beacons were available for determining position — one collocated with the VOR station), and the pilots did not aurally identify the VOR station they were using.

(Adapted from BOAC Air Safety Review)

Too Little Performance

The crew assembled and the helicopter pilot briefed for a simulated search and rescue mission at a remote mountain training area. The AC told his crew that en route to the site they would drop a piece of equipment to a camp site and photograph the area for possible future rescue missions. The area was not an approved training site and no prior permission had been obtained.

The result of unauthorized deviations.

The aircraft departed for the remote area and after a short flight arrived at the camp, perched more than 9,000 feet above sea level.

The pilot and the flight mechanic discussed aerial delivery procedures, and finally decided to make the delivery into a clear area near the camp.

The aircraft descended to approximately 300 feet above the ground. An approach was initiated but broken off when the crew spotted people gathering ing in the landing area.

On the second approach, the pilot slowed the bird to approximately 50 knots and descended to an altitude between 100 and 150 feet AGL on final approach. The aircraft approached the drop area and the copilot called out, "Rotor, rotor," as the rpm dropped from 104 percent to 99 percent. Quickly scanning his instruments, the pilot saw that the rotor rpm had deteriorated to 92 percent and airspeed to a dangerously low 20 knots. Realizing he could no longer maintain flight, he decided to make a forced landing on a sloping, rocky clearing short of the drop zone. He lowered collective, flared slightly to further reduce ground speed, and then brought the collective full up to cushion the landing. The nose gear hit first and collapsed. The aircraft then settled hard on the left main gear and finally came to a stop.

A crumpled fuselage, wrinkled sponsons, collapsed nose gear, and damaged main gear greeted the crew as they stepped out of the chopper.

Had the pilot computed performance data prior to his fateful approach, he would never have attempted the impossible maneuver. He would have found that power demands at this altitude and gross weight simply exceeded the helicopter's performance capability.

Only the pilot's skill and experience salvaged a minor accident from what might well have been a fatal air crash; but his use of an unauthorized landing site and failure to compute performance data combined to cause the mishap. Air discipline is indeed the soul of aviation, and disregarding the performance capability of an aircraft is one rule of discipline that a pilot won't succeed in breaking very often.

Get your safety manuscript in now.

The Halfway Point:

1974 MAC Safety Writing Contest

It's 15 degrees below zero outside and a raging blizzard is adding an inch of snow an hour to your lawn. Your eight cylinder chariot is but a mere bulge under the pile of snow. Before the television antenna blew down, Cyrus Cirrus, the network crack meteorologist, predicted that this massive corkscrew low will remain stationary for another 36 hours. The squadron just called and said to stay put. Your wife is in bed, suffering from the flu. The kids are down in the basement playing contentedly with their Christmas toys.

Your den is unusually quiet. The only noise is the wind whipping the snow past the window. You've got time to use — but how? You mutter to yourself, "What the hell am I going to do for the next few days — maybe three or four depending on the plows?" Glancing down on the desk, you notice the January issue of THE MAC FLYER folded open to page six, "Writing Contest Reminder."

"That's it! I've been looking for just such an opportunity to write a few words about flying airplanes," you say.

Everyone of you MAC fliers has a story to tell — a story which could help another flier do his job a little safer and more efficiently. But don't wait for a blizzard to write. It may never come, particularly if you're in SEA. Make the time. Spend a few evenings behind a typewriter, or dictating to your favorite female. Focus your story on: one of your line missions, inflight emergencies, training missions, special missions to Hanoi or Tel Aviv, technical articles, helicopter operations, rescues, fiction or nonfiction. The list of possibilities is virtually limitless.

The contest will end on 31 March 1974. The first three winners will receive handsome, engraved walnut desk sets. Honorable mention winners will be awarded impressive pen and pencil sets.

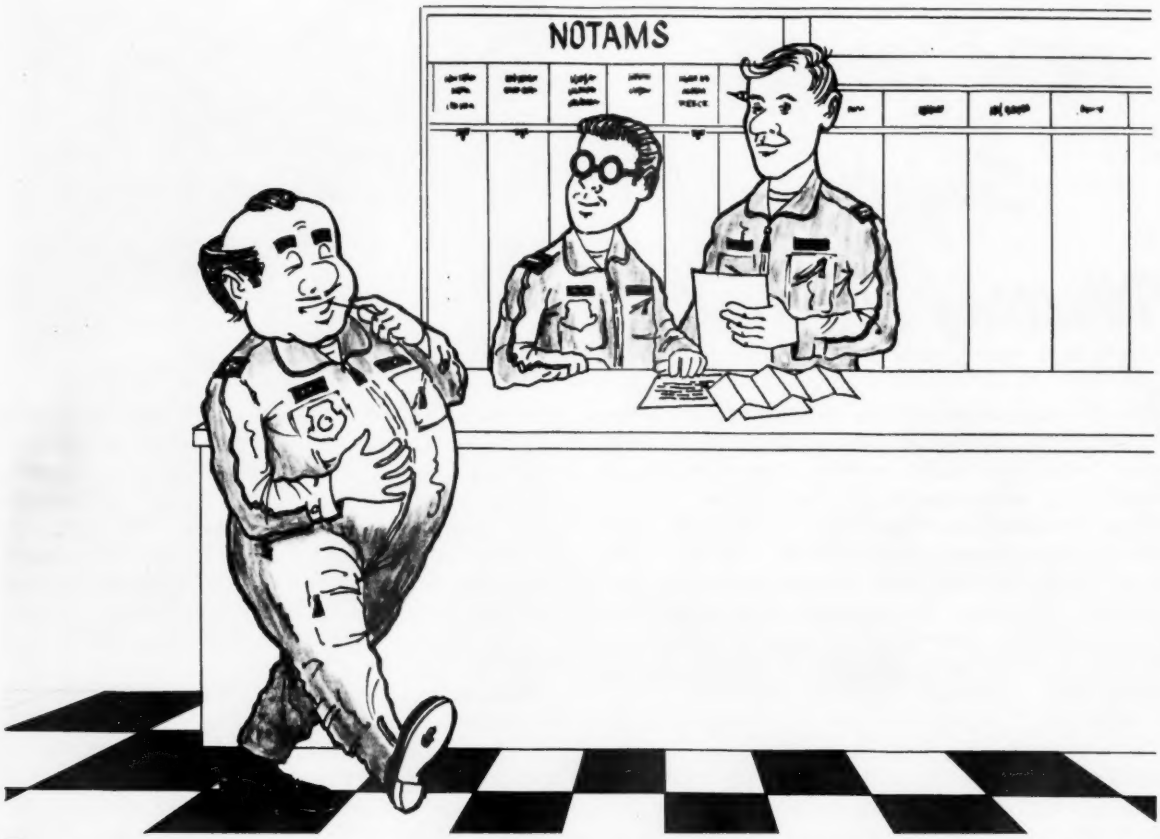
Only military personnel and DAF civilians assigned to MAC or MAC reserve forces are eligible for awards, but anyone may submit an entry which, if selected, will be published.

Entries must be original, unpublished, and have a flying safety message. Please keep your entry between 1,000 and 3,000 words. That's about six to 14 typewritten pages, double spaced.

Get started while there's still time. MAC needs your message!

The Master Manipulator combines a fuel shortage with erroneous planning in an unintentional flirtation with the Pacific Ocean.

C.R. TERROR



Long Suffering Sam and Blinky had checked and rechecked the fuel figures by the time the Rotund One had finished his third onion garnished enchilada and joined the crew in the Yokota flight planning room.

"We either need better winds, a shorter leg, more fuel, or less cargo," blurted Blinky. "There just isn't enough fuel on board to make it all the way across North Pac One and still have the required reserves."

"What's this junior Magellan trying to pull now?" asked the World's Finest, frowning at his copilot.

Sam confirmed the nav's warnings. "We had the weather briefing while you finished your breakfast and the forecaster said the winds wouldn't help us much today. Travis weather is above min-

imums now, but fog is forecast for the entire valley when we arrive. In short, we need more fuel."

"Let me see those figures," snorted C. R. He glanced at the flight plan. "This computerized spit-out shows that we're only a couple thousand pounds short; nothing to worry about m'lads. You know this stove-piped freight car we fly manufactures its own fuel. Besides, did you forget we've got a fuel crisis back home? Let's press on."

The two helpers exchanged puzzled glances, wondering if the boss had just suffered gastro-intestinal damage, or if a malady had climbed to a higher plateau in his rotund body. They could hardly believe their leader had chosen cargo over fuel. C. R. usually talked the Command Post into extra fuel for even the most minute reasons. It was obvious he was in one of his "Let's-get-airborne - quick - before - they-reroute-us" moods.

With C. R. in a hurry and a tummy full of Mexican food, Sam grew increasingly fearful that he would cross the Pacific without a break while the boss recuperated.

A crew bus was waiting as the three exited the snack bar with their predeparture refreshments. The Pudgy One drew on a partially frozen can of his favorite cola on the way to the aircraft. "You know," complained C. R., "they make this drill such a task for us airborne types. Airline crews just walk right from their quarters to a bus and then it's direct to the machine for a fast takeoff. Their pilots don't get burdened with minor decisions like fuel requirements."

It was then that the navigator noticed the Aerial Ace was in some discomfort. Probably why the race started in the flight planning room, Blinky thought. The paunchy form seemed to be shifting from side to side as the bus approached the aircraft. C. R. quickly excused himself, explaining as he disappeared into the crew compartment that he had to check the forms and put the clearance on request. His portable, potable kit and the hand-tooled leather hang-up bag were left on the ramp for the younger troops to handle.

Sergeant Torque met the World's Finest Connoisseur of gastronomical delights at the entrance door. "Sir, we don't have as much fuel on board as we usually have out of here."

"No sweat, sergeant," C. R. burped. "We're covered for this particular leg. With your able leader at the helm, we'll make up for it. This flying game is more art than science, you know, and the Old Master has learned every trick in the book."

Sergeant Torque seemed satisfied that the Major knew something about the flight that he was keeping to himself.

* * *

As the sleek Starlifter climbed through 10,000 feet, the Fearless Leader mashed out a gold ringed Egyptian Oval from his ebony holder. "Sammy m'boy," the mustached Lothario commanded, "you got it. You know the way home. Just keep us at 330 and we'll have a ride to the coast as smooth as the skin on my raven haired lovely from the city. And keep us at .767 so I can meet her for happy hour."

The right-seater shuttered with the thought of another long stint in the seat. He noted an air of sarcasm in C. R.'s voice, though, and thought it wise not to remind the confident pilot of the fuel situation. So, the harried crew member settled down to endure the forthcoming flight.

In a few hours it became obvious that an unexpected weather system was moving into the aircraft's flight path and that help from the jet stream was subsiding. They were in cirrus now and a solid undercast spread ominously below. The Starlifter's ground speed dropped well below what had been flight planned. The chop slowed the ground speed further and quickly created bone-jarring bumps which tossed C. R.'s flight lunch around the cockpit. Blinky giggled deviously as he replaced a smashed soft boiled egg in the top of the flight lunch box and glanced at the up-

C.R. TERROR —continued

per bunk to see if the Fearless One had been awakened. Noting the smile on the Major's tranquil face, he decided that the jolts must have added to the obviously pleasant reverie of C. R.'s slumber.

After passing ETP and noting the fuel curve was staying well above the planned line, Sam made what was for him a momentous decision. He decided to awaken the slumbering Manipulator of Wires and Tires to explain the fuel shortage. There was some doubt, at this point, whether they could make it to destination without diverting to refuel. There was a lengthy discussion as to whom should be assigned the duty of awakening the snoring aircraft commander.

Finally, Sergeant Torque was chosen to bring the Able Aeronaut back to reality.

"Cheez," snapped the sleepy commander as the sergeant tugged at the blanket, "you just broke in on a very interesting situation. My red — ahh, forget it, you wouldn't understand. What do you want?"

The engineer retreated back to the panel. Sergeant Torque would rather fly a mission over Hanoi than awaken Major Terror.

"My two hours up already?" huffed the Major as he strapped in. "You young pilots ought to learn to spend a little more time in the seat. It's up here where you'll gain experience for upgrade." C. R. had not bothered to look at his watch. It had been seven hours plus since takeoff.

The number two pilot had been watching the fuel reserves slowly deplete. The shortage on takeoff, together with flying faster than flight planned, and not step climbing as directed by the charts, had Sam in a nervous state.

"Sir, we seem to be a little short of fuel. Don't you want to step climb like the fuel charts say?" he beseeched the Great One.

"Nawww, why, I just lay my pigskin wallet sideways between the planned line and the actual line. See, there's no daylight on either side of the wallet, so we'll stay down where the air's thicker. Don't want to get a nose bleed." C. R. stuck his pudgy thumb on the interphone switch and asked Blinky, "What's block time?"

"Well sir, we should be over the field in three hours, but I don't know if we'll have enough fuel to . . ."

C. R. interrupted. "Here, here. You just keep drawing your lines and I'll worry about keeping the flames a'burning. We'll just penetrate at the mach, and make up enough time to get us through customs and still make it to half priced drinks at the club."

The navigator had been busily refiguring the fuel chart. "Sir, you can see all the enroute reserve is gone; the holding fuel is gone; and we're dipping into the alternate fuel already. I really think we ought to divert to get some more."

The Undaunted Master rubbed his heavily brushed brows.

"You're not going to give me that SOS talk about the synergistic effect of fuel planning are you? The winds always pick up at the end of the flight. We'll have enough gas on board at landing to heat a city. Those charts were made for the uninitiated. You stick with the Master and I'll keep you out of trouble."

The flight deck grew quiet as the rest of the crew began planning for the worst. Finally, Sam broke the silence with the announcement that the Command Post was on the radio with a weather warning.

"The weather at your destination is yellow and forecast to remain so for your time of arrival. However, there is a possibility of ground fog that could put the field intermittently below minimums."

"Roger that," answered the slightly wavering voice of the Avoirdupois Aviator, giving evidence for the first time that some doubt had penetrated his cerebrum.

"What're those clowns trying to do to us? If they're going to pull that unexpected weather report routine on me, I'll just go some place else. Blinky, what's

the closest base that we can go to now?"

"Travis, Sir! We've gone too far now to divert." Blinky had turned a pale green — all hope having vanished after hearing the report.

"Garf," replied Terror, his mind racing over the consequences of ditching in the Pacific! "Maybe we ought to slow this hog down. What altitude does the chart say we should be flying at now?"

The navigator had checked this so many times that his reply almost cut his aircraft commander out on the interphone. "We should have climbed to flight level 410 quite some time ago."

* * *

"Sammy, declare an emergency. Approach is going to keep us up here all day if we don't." The weather was lifting to minimums as the Ace Interpreter of Instruments spoke.

The radar vectors and AWLS landing expedited the approach. As the aircraft touched down, a sweaty paw clutched the nose wheel steering.

"A piece of cake." C. R. took deep breaths during the rollout on the runway, trying to regain his composure.

"Sir, the Command Post is on the horn. They want to know why we had to declare an emergency for fuel problems." Sam's voice was emotionless.

C. R. responded in his usual manner. "Wouldn't you know it. We have to do all the fuel planning for them, and then they want to know the facts when we arrive with a little less than normal on the fuel."

Sergeant Torque entered the conversation. "I've just totaled the fuel in all tanks. We have 1,200 pounds on board."

"Engineer, isn't that what the Dash One says we should have for a crash landing?" asked the copilot, his eyebrows arched over two wide eyes.

"Yes sir, but that's for each engine, not for all four."

The usually unshakable aeronaut was completely ineffective as he tried to explain the circumstances to the Command Post. His rationalization fell on deaf ears.

As the Starlifter turned into the parking spot, Blinky spotted the blue staff car. "It looks like the Wing Commander has gotten the word already."

"Wouldn't you know it?" asked the man at the wheel. "Those Command Post weenies never could keep a secret."

The man with the lightning bolts on his hat and a star on his shoulder entered the cockpit quickly after engine shutdown.

"Major Terror, what's this fuel shortage all about?" The general's voice was direct in its query.

Beads of perspiration again formed on the discouraged driver's forehead. "Well, Sir, I ahh, we ahh, well you see the fuel..." C. R.'s tongue was heavy and dry. The quiz was brief and to the point. None of the answers satisfied the inquisitor. Then, as sharply as the conversation had begun, it ended.

"Major, I'll see you and your squadron commander in my office at 0800 tomorrow. You'd better have your ducks in a row." With this, the wing commander stormed off.

"You'd think this was a federal case," offered C. R. to an unsympathetic crew. "Well, let's get with it. We have to get through customs."

As the crew finished clearing customs, C. R. regained some of his color and candor. He waved goodbye to the crew and boarded his favorite four-wheeler along side Stella. "Hi, kid. What'd ya say we lay a little rubber and have a few medicinal doses at the club before heading to the city?"

Getting approval from his girl, the smooth one began to play out the sequel to his flight. With his wallet, his doll, and his plans all in the "go" position, C. R. suddenly discovered his poor fuel planning had begun prior to his flight. As Stella and the Master started down the street for an evening of fun, his kelly green 'Vette jerked, coughed, sputtered, and flamed out. The gas gage told the story — empty.

Capt Hogan and Crew

MILITARY AIRLIFT COMMAND

GOOD SHOW

Standing, left to right: Capt William A. Vance and 1Lt George Harrison, pilots; MSgt Willie D. Evans, flight engineer; kneeling, left to right: Capt Bart C. Hogan, instructor pilot; CMSgt Dewey B. Cook and MSgt Edward E. Alvarez, flight engineers.

On 23 October 1973, while preparing for landing during a local training mission, Capt Bart C. Hogan and his crew of the 443 MAW, Altus AFB, OK, discovered that the nose gear of their C-5 wouldn't fully extend. Using Dash One procedures, the crew made numerous attempts to lower it. The nose gear remained red wheels.

The aircraft made a tower fly-by. Observers radioed that the gear was extended below the fuselage with the strut approximately 45 degrees from the vertical position. Capt Hogan took the aircraft to 13,000 feet and, using emergency nose gear extension procedures, made another unsuccessful attempt to lower the gear. Conference Skyhook was then initiated and the decision was made to land on a foamed runway.

Fuel was jettisoned down to 25,000 pounds, and Capt Hogan planned his landing so that the nose gear would touch down in the foam which had been spread from 3,000 to 7,000 feet down the runway. With the nose gear still partially extended, the Galaxy touched down precisely as planned. The gear maintained its intermediate position during the landing. There was no damage.

A subsequent investigation revealed that the malfunction was caused by internal failure of a right angle gear box.

The incident was the second in as many months involving the landing gear on this aircraft. In both cases, crews were praised by COMAC for their professional response.

In his congratulatory message to Capt Hogan and crew, General Carlton stated, "Your coordinated action when the nose gear would not fully extend prevented serious damage and injury. Your timely decisions and subsequent expertise in landing safely on a foamed runway, with the gear still partially extended, are testimonial to the professionalism of each of you."

THE MAC FLYER takes pride in joining the Commander of MAC and the rest of the Military Airlift Command in saying, Good Show!

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Dear Doc:

My long range eyesight is just beautiful, but I'm having trouble seeing the guy standing next to me. Letdown plates, maps, and instruments are getting harder to read. What's wrong with my eyes?

I. C. Blurry, Lt Col

Dear Blurry:

Good vision is essential for aircrews. Crew members must be able to maintain a good lookout, read instruments and maps, and judge distances and depth in very bright, or very poor, light. They must be able to switch rapidly between the outside world and the cockpit. The normal eye can do this, but the myopic (near sighted), or the hyperopic (far sighted) eye, or the aging eye needs help. Corrective flying spectacles provide the necessary assistance. A person with normal eyes (the emmetrope) focuses at infinity when his vision is relaxed. For nearer objects, the muscles around the lens contract, the lens becomes more spherical and the focus is brought closer. This is called "accommodation." In childhood the lens is soft and pliable, so children accommodate without difficulty. But as the years roll by, the lens stiffens up. At first, the muscles have to work harder to achieve the same result, but later on the lens resists compression and near vision is lost. A man of 39 can only accommodate half as well as he did at 10, by 40 only one-third, and at 50 only one-seventh as well. This condition is called presbyopia.

You may not, of course, be born with normal eyes; more than half of us are not. Your eyeballs may be too long or too short. If too long the resting focus will be on some point closer than infinity ("infinity" in this context is 20 feet plus). If this is so you are near sighted. Myopia is the term. You can read alright, but because the muscles in the eyes can only compress the lens and cannot pull it flat, the myope cannot focus on distant objects. To do this he always needs glasses. A navigator friend (I have friends in both camps) uses flying specs for myopia — he can plot and do radar without them, but the image in the sextant is projected to infinity so he uses his specs to see the stars clearly.

If your eyeballs are too short, you are in good company as far sight (hyperopic) is the most common abnormality. The light rays in the far sighted eye are focused behind the retina so the picture is blurred. Spectacles may be needed in the more severe cases, but generally the hyperopic can focus clearly by accommodation. However, as he gets older, if he is tired or has to maintain focus for a long time, or if the light is poor, it becomes harder for him to focus. The problems of the aging eye (presbyopia) are made worse for the far sighted. A moderate degree of hyperopia is acceptable for aircrews, but those with greater degrees are rejected. This is because the muscles of accommodation can become fatigued and a pilot could unexpectedly find himself unable to focus on his instruments, especially at night. Thus, eyestrain when reading, or difficulty in maintaining focus during a long period of flying or driving, could be an indication for corrective glasses.

Don't let your eye problems worry you. If your unaided vision is below par or deteriorating, an optometrist can easily correct such problems with prescription glasses.

See you around.

DOC

— Flight Safety Review

What the Weatherman Sees

Visibility in an airport environment is one of the most difficult of all phenomena to measure, a factor which sometimes causes pilots to execute missed approaches simultaneously with outbursts of profanity toward the weatherman.

Even in this day of scientific miracles, the most effective visibility measurement remains individual eyesight, a method which continues to plague weather observers in their quest for accuracy.

While modern instruments can measure cloud heights, wind, and temperature, there is no scientific method to measure what a pilot will see as he looks toward the runway from his final approach angle.

What do they measure?

True, there are visibility measuring devices at all major airports, but just what is it that these instruments are measuring and how do their readings affect the weather observation you receive?

In the aviation weather observation, visibility is intended to be a measure of the transparency of the atmosphere, evaluated in terms of what the normal human eye can see.

But the transparency of the atmosphere decreases in relation to the number of particles of foreign matter suspended in it. Dust, smoke, snowflakes or water droplets all scatter light rays and reduce visibility.

The angle of the sun's rays passing through the atmosphere also affects visibility. Other factors, such as industrial smoke, likewise enter into the visibility picture.

The only way available now to give pilots a reasonable estimate of the visibility they will encounter is by measuring visibility from the ground.

To make use of visibility reports, pilots should understand how the observations are made and their limitations. With present methods, visibility can be measured along a pilot's line of vision only on the ground.

Probably the most misunderstood visibility classification is runway visual range (RVR). Approach criteria are based on this. But what is the difference between RVR, prevailing visibility, runway visual visibility (RVV), and slant visibility.

Prevailing visibility

To evaluate prevailing visibility, the weather observer looks for prominent landmarks around his station. He knows the distance to various permanent objects — radio towers, buildings, hills — within visual range of the airport. In daylight hours, he uses these reference points to determine the visibility. At night, he looks for permanent lights of known intensity and distance.

The observer reports essentially the median distance — in miles and fractions — that prominent objects can be seen and recognized throughout the horizon around his station. He might, for in-

stance, be able to see three miles to the north and south, five miles to the east, and one mile to the west. Prevailing visibility would then be three miles.

This procedure attempts to ensure that a pilot knows what to expect when he is circling the airport.

If visibility is three miles or less, the observer may add remarks to his report. In the situation described above, he would report the prevailing visibility as three miles and might add that visibility was five miles to the east and one mile to the west. These remarks are very important and should never be slighted in reading aviation weather reports.

Runway Visual Range

The pilot's main interest is visibility on the runway, and this is not necessarily the same as prevailing visibility. Runway visual range (RVR) is an instrumentally derived value, based on standard calibrations, that represents the horizontal distance a pilot will see down the runway from the approach end. At most Air Force bases and other DOD installations, visibility is automatically computed and recorded by a sophisticated network of light projection, detection, and recording equipment. This RVR system consists of a transmissometer, visual readout indicator, and a visual distance computer. The core of this visibility measuring system is the transmissometer, a high intensity light projector and a light sensitive detector which measures the transparency of the atmosphere close to the instrument runway. The transmissometer is generally positioned 600 feet parallel to and 500 feet down the approach end of the runway. Fog, precipitation, industrial pollutants, and other reducers of visibility will diffuse the projected light beam in varying degrees. The mean percentages of diffused light detected is automatically transmitted to a visual readout indicator and scroll graph recorder in the weather station. Percentages of detected light are electronically fed into the visual distance computer and are converted into meaningful visibility measurements — RVR. The computer also applies aircraft speed and runway light intensity factors to the computed RVR.

The transmissometer system computes visibility from near zero conditions to approximately ten miles, at one minute and ten minute intervals. Minute readings are transmitted to tower and RAPCON and ten minute readings are teletyped to other Air Force weather stations. So, if you are flying an approach in the soup, Approach Control receives visibility update each minute to keep pace with possible rapid changes. PMSV relays the ten minute observations. When the prevailing visibility exceeds one statute mile, RVR values are no longer transmitted by the weather station.

Runway Visual Visibility

The fundamental difference between RVR and RVV is the method of determination. RVR is computed by an elaborate array of specialized equipment. RVV is usually a derived observation that represents the horizontal distance a pilot can see down the active runway during takeoff or landing. Without remote equipment, a weather observer normally computes RVV by counting runway lights or other prominent runway features and converting them into RVV in fractions of miles. For example, seven to eight runway lights equals one-fourth of a mile; 13 to 16 equals about a half mile.

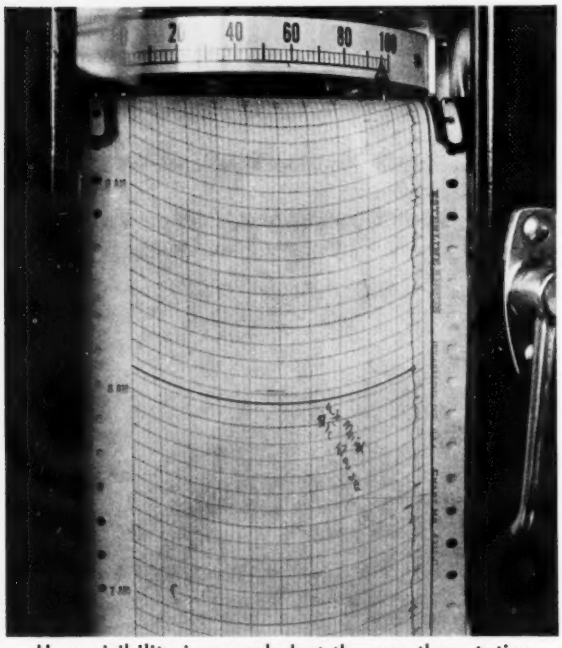
There may be isolated occasions during low visibility conditions when a RVV check will be required because RVR equipment located along each

Light projection and detection equipment near the instrument runway

WEATHERMAN — continued

end of the runway is not providing accurate runway visibility. This situation may exist for one of two reasons — the equipment may not be functioning properly or, since the equipment is displaced 600 feet from the center of the runway, usually in grassy areas, visibility conditions may be different than those observed at the middle of the runway.

At times, when the RVR is not available or is below takeoff or landing minimums, the SOF is authorized at many MAC bases to obtain an RVV reading. If requested, the SOF will position himself at the edge of the active runway threshold and count the number of lights seen along the opposite side of the runway. He will then refer to

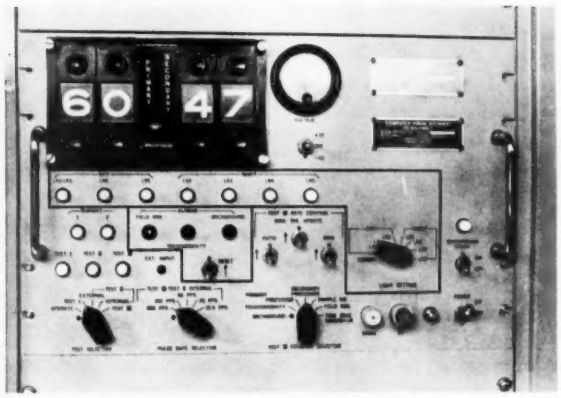


How visibility is recorded at the weather station

the following table for the RVV:

*NUMBER OF LIGHTS	RVV
1 to 6	-1/4
7 to 8	1/4
9	5/16
10 to 12	3/8
13 to 16	1/2
17 to 19	5/8
20 to 23	3/4
24 to 26	7/8
27 to 30	1

*200 feet between runway lights



RVR values displayed by computer

RVV can also be computed using part of the automated RVR system. The percentages of detected light are traced and recorded on the visual readout indicator scroll. The forecaster converts these light percentage values traced on the scroll graph into RVV readings by referring to visibility tables in the Federal Meteorological Handbook, Surface Observations.

Regardless of how runway visibility is determined, the visibility from an aircraft may be quite different from that on the surface where actual observations are made or computed. Often, a pilot in the air can see the ground through a low-lying fog when the surface visibility is very low. At other times, the surface visibility may be eight or ten miles, but haze or smoke aloft may completely obscure the ground.

Slant Visibility

No existing instrument can measure visibility from the aircraft to the runway. If there were such an instrument, it would tell the pilot at what height and at what distance from the end of the runway he could expect to recognize objects on the ground. He would then know in advance how many seconds he would have to touch down once the runway was sighted.

Today, slant or in-flight visibility measurements come only from pilots. These reports are valuable to forecasters, briefers and other pilots. Air-to-air, air-to-ground, and slant visibilities become more and more important as aircraft fly faster.

Scientists are seeking ways to measure slant visibility, which, when it is found, will let a pilot know exactly how much time he has to correct his final approach.

— Adapted from FAA AVIATION NEWS

Engines Quit

The C-141 was cruising in clear, smooth air at FL 370 when suddenly it yawed slightly to the right, swung back abruptly to the left, and rolled up to 45-degrees.

The pilot quickly turned off the yaw damper and shut down the autopilot as the Starlifter continued yawing back and forth and rolling up to 60 degrees.

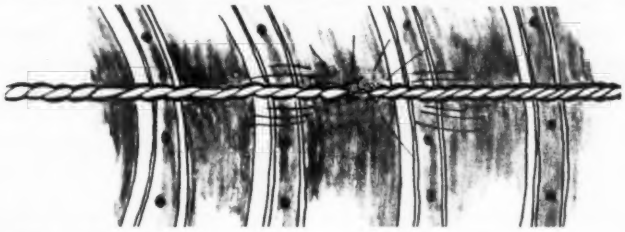
A few seconds after the gyrations began, both engines on the left side flamed out. The pilot hurriedly restarted them, but had no sooner gotten them back on the line when numbers three and four quit.

The flight examiner pilot, occupying the jump seat, quickly restarted the second set of engines. By now the C-141 had lost seven thousand feet. At about this point, the flight examiner turned the yaw damper back on and the pilot regained control of the machine at FL 290.

After leveling off, the co-pilot noticed that the yaw damper inoperative light was illuminated, leaving doubt that the yaw damper had aided in the recovery. The damper switch was turned off and left that way until the descent back to home base. During the descent, it was turned on again and, although it seemed to operate properly, the crew decided to turn it off for the remainder of the flight.

The incident was still under investigation as THE MAC FLYER went to press.

Snapped Cable



Shortly after reaching decision height on a GCA, an HH-3 Jolly Green began to yaw slightly to the right. At approximately 15 feet above the runway, the pilot increased collective to cushion the landing and the yaw increased rapidly. Still in the air, the pilot reduced collective and retarded the engines to ground idle. The helicopter touched down in a level attitude with some left rotation as power was reduced.

Post-flight inspection revealed a failed tail rotor control cable. Further investigation showed that the cable at one time had been misrouted over a 90-degree pulley guide pin but this condition had been discovered and corrected prior to the flight. Investigators believe the cable was weakened by abnormal stress caused by the improper initial installation and, subsequently, failed.

The loss of tail rotor control caused an extremely serious control situation. Fortunately, the helicopter was a few feet over the runway when the cable gave way. In another phase of flight, a safe emergency recovery might have been impossible.

QS —continued

Slick Stuff

While the effects of hydroplaning have been well publicized throughout the aviation world, another type of skidding, which can be just as hazardous, probably hasn't been given its fair share of notice.

It's called viscous skidding, and ideal conditions for it are heavy rubber deposits on

the runway, light rain following a dry period, and a pilot unaware of its existence.

A commercial jet came close to careening off the runway recently when it landed slightly cocked following a light rain. Using full reverse and anti-skid braking, the aircraft began skidding as it passed over a buildup of rubber deposits.

No doubt there are many pilots who have experienced the phenomenon to some degree without actually being aware of just what was causing them to skid.

What happens is this: water fills the pores of the runway texture and acts as a lubricant between the rubber deposits on the runway and the tire, creating a surface more like a freshly waxed linoleum than a runway. When tire loads are introduced through braking or skidding, the thin film of water is turned into trapped steam beneath the tire. The steam breaks down the rubber cure in both the tire and the rubber deposits, creating a near perfect seal. This trapped steam pressure causes the tire to rise off the pavement and, hence, the skidding.

Once this occurs, the skidding may continue onto a clean runway surface since the tire surface itself has been transformed into a lubricant.

So watch out for viscous skidding. Remember, heavy rubber deposits predominate the ends of the runway. And that's where you'll either be touching down or completing your landing roll.

— Adapted from FLIGHT DECK

Block Training Pays Dividend

How well do you remember the first-aid procedures you keep hearing each year during block training? One alert airman who did remember responded to the needs of a crew mate and possibly saved his life.

The aircraft was approaching the 10-minute warning on a low level airdrop mission when the loadmaster experienced chest pains and lapsed into unconsciousness. Shortly afterward, another crew member found the unconscious loadmaster. He notified the aircraft commander and immediately administered oxygen. An emergency landing was made and medical care administered.

The Flight Surgeon determined the unconsciousness was caused by hyperventilation induced by physiological reaction to the chest pain. The chest pain was caused by muscle spasms. There was no evidence of a heart attack.

It makes sense to review first-aid procedures as well as flying procedures. With incapacitated crew members, flying activities are likely to come to a halt, anyway.

Off and Flying

"Reject," cried out the flight engineer, as the C-141's number four oil low quantity light illuminated, just two knots below rotate speed.

The first pilot, in the left seat, pulled all four throttles to the reverse idle position to abort the takeoff. But as the automatic spoilers deployed, the aircraft pitched up and became airborne, flying two to five feet off the runway for about three seconds. The instructor pilot took over and quickly advanced the throttles to slow the descent as the big bird settled back to the runway. The engines were reversed again and brakes were applied at approximately 80 knots. The anti-skid off lights illuminated as the Starlifter slowed to taxi speed.

The ramp and pedal doors were damaged during the pitch-up and three of the eight main gear tires had blown during braking.

No malfunction could be found in the oil system or anti-skid system.

The aircraft was being operated at a low gross weight, a situation which can cause problems during an abort. Pilots should be prepared to counteract the pitch-up as soon as spoilers are deployed. Otherwise, a lightweight bird could take to the skies on its own.

Helicopter Hang Up

There is nothing particularly unusual about an aircraft engaging a runway barrier, presuming the aircraft is of the fast mover variety such as a Phantom, Thud, or the like. But what about a helicopter taking the barrier? One helicopter crew, to their dismay, found a way, quite by accident.

As the HH-3 was returning from a sling training mission, the flight mechanic stowed the sling cargo hook and settled back for the return flight.

The helicopter was cleared for a precision approach and the instructor pilot advised the pilot to land in a position which would enable them to clear the runway at the first taxiway and avoid extensive construction on the airfield. As the Jolly Green passed over the BAK-12 barrier at approximately five knots, the cargo hook caught the barrier. The instructor pilot took control of the helicopter, reduced power, and maintained a level attitude. The aircraft landed within 40 feet. The only damage was a few minor scratches on the cargo hook housing.

Apparently, at some point between departing the training area and arriving at home base, the rope securing the cargo hook came loose, allowing the hook to dangle about two feet below the landing gear. When the chopper passed over the barrier, the hook caught, and the bird quick-stopped.

This incident is a vivid reminder to flight mechanics of the hazard created by failing to adequately stow the cargo hook.

the ANALYZER

I KNEW THERE WAS A FULL SHOT [illegible] IT DIDN'T
BELIEVE THIS BIRD WOULD EVER RUN [illegible]

after deadline . . .

GUSTY WINDS MOVE C-141'S -- On two separate occasions, gusty winds moved two 180,000 pound C-141's which were parked on snow-packed ramps. Winds of up to 43 knots in velocity blew one Starlifter into an MD-3 power cart, causing minor damage to the aircraft. The other C-141 came to rest with a damaged nose wheel torque tube assembly after being displaced 20 feet by winds gusting 20 to 30 knots.

Dash One adverse weather mooring guidance and procedures are currently in the mill. But until the Dash One reflects the change, page 2-6a of the Dash Two contains aircraft mooring info and related data which might prevent future incidents on wintry surfaces.

ERRATIC YAW DAMPER -- A C-141 crew recently experienced a rudder hardover which caused extreme yaw and roll oscillations and near simultaneous flameout of all four engines (see Quick Stoppers - "Engines Quit," page 27, this issue).

After the incident had been briefed at a wing flying safety meeting, one of the pilots reported that he had experienced similar rudder difficulties on the same aircraft. On the basis of this information, investigators reconvened to review the histories of both flights. They found that on each occasion the hardover occurred after approximately two hours and 30 minutes of flight. Investigators suspected that the problem was caused by a faulty aircraft yaw damper system.

Bench tests were run on the yaw damper components. After operating for two hours and 15 minutes, the yaw damper computer power supply voltage dropped below the minimum acceptable level; after two hours and 30 minutes the voltage supply became erratic. The bench test was repeated several times with similar results, bearing out the investigators' suspicions.

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Another day begins